



# Feather Physics

2019 - Driftwood Education Center



## **Class Description:**

*Students will examine the general principles behind the physics of flight. We will discuss the forms of aerial locomotion, and the animals that use them. Students will be immersed in experimentation, discussion, and observation to understand these flight principles.*

**Most appropriate for grade levels 5-8  
Can tailor all classes for High School Students**

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## Feather Physics

### Pre-class set-up (5-10 min)

1. Make sure you have all the necessary equipment gathered that you will need for the class.
2. Check the stock of Alka Seltzer and film canisters, and ensure that you have enough of each.
3. Decorate the room with wings and other bird items.

### I. Introduction (5-10 min)

1. Introduce adaptations for flight
2. Introduce external forces affecting flight

#### Concept 3

### II. Physics of Flight (25 min)

1. Discuss air pressure
2. Air pressure experiments
3. Four forces of flight
4. Discuss Bernoulli's Principle
5. Bernoulli's Principle experiments

#### Concept 1 - Outcomes 1, 2,3

### III. Strategies of Animal Flight (35-45 min)

1. Four types of flyers
2. Soaring experiment
3. Flapping game
4. Seeing the birds

#### Concepts 1,2,3 - Outcomes 1,2,3,4

### IV. Conclusion: (15-20 min)

1. Film canister rockets
2. Wrap up/assessment of topics

#### Next Generation Science Standards met:

**MS-PS2-2.** Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

**MS-PS2-4.** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of the interacting objects.

#### S. Carolina Standards met:

##### 4<sup>th</sup> Grade-High School:

4.S.1A.3 Plan and conduct scientific investigations to answer questions, test predictions and develop explanations.

##### 5<sup>th</sup> Grade:

5.P.5A.2 Develop and use models to explain how the amount or type of force (contact and noncontact) affects the motion of an object.

5.P.5A.3 Plan and conduct controlled scientific investigations to test the effects of balanced and unbalanced forces on the rate and direction of motion of objects.

##### 6<sup>th</sup> Grade:

6.L.4B.2 Obtain and communicate information to explain how the structural adaptations and processes of animals allow for defense, movement, or resource obtainment.

## Concepts:

Focal points of this class are:

1. Flight can happen because of certain forces and physics principles, and we can investigate these concepts through experiments.
2. Animals can use four types of aerial locomotion.
3. Birds have unique adaptations that allow them to fly.

## Outcomes:

Upon completion of this class, students will be able to:

1. Understand and investigate, through experiments, the four forces that affect how flight works.
2. Understand that air pressure plays a critical role in the ability for an animal to fly.
3. Identify unique adaptations in a bird's ability to fly.
4. Discuss the different flight strategies that bird use.

#### Georgia Performance Standards met:

##### 4<sup>th</sup> Grade:

S4P3. Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces.

##### 7<sup>th</sup> Grade:

S7L1. Obtain, evaluate, and communicate information to investigate the diversity of living organisms and how they can be compared scientifically.

#### Florida Standards met:

##### 4<sup>th</sup> Grade:

SC.4.P.10.4: Describe how moving water and air are sources of energy and can be used to move things.

##### 5<sup>th</sup> Grade:

SC.5.L.14.2: Compare and contrast the function of organs and other physical structures of plants and animals.

SC.5.P.13.1: Identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.

SC.5.P.13.4: Investigate and explain that when a force is applied to an object but it does not move, it is because another opposing force is being applied by something in the environment so that the forces are balanced.

##### 6<sup>th</sup> Grade:

SC.6.P.13.1

Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.

SC.6.P.13.3

Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.

##### 7<sup>th</sup> Grade:

SC.7.P.11.4

Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.